

Temperature TMDL Overview

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Mid-Coast Implementation Ready TMDL
Local Stakeholder Advisory Committee Meeting

Wednesday May 16, 2012
Florence, Oregon

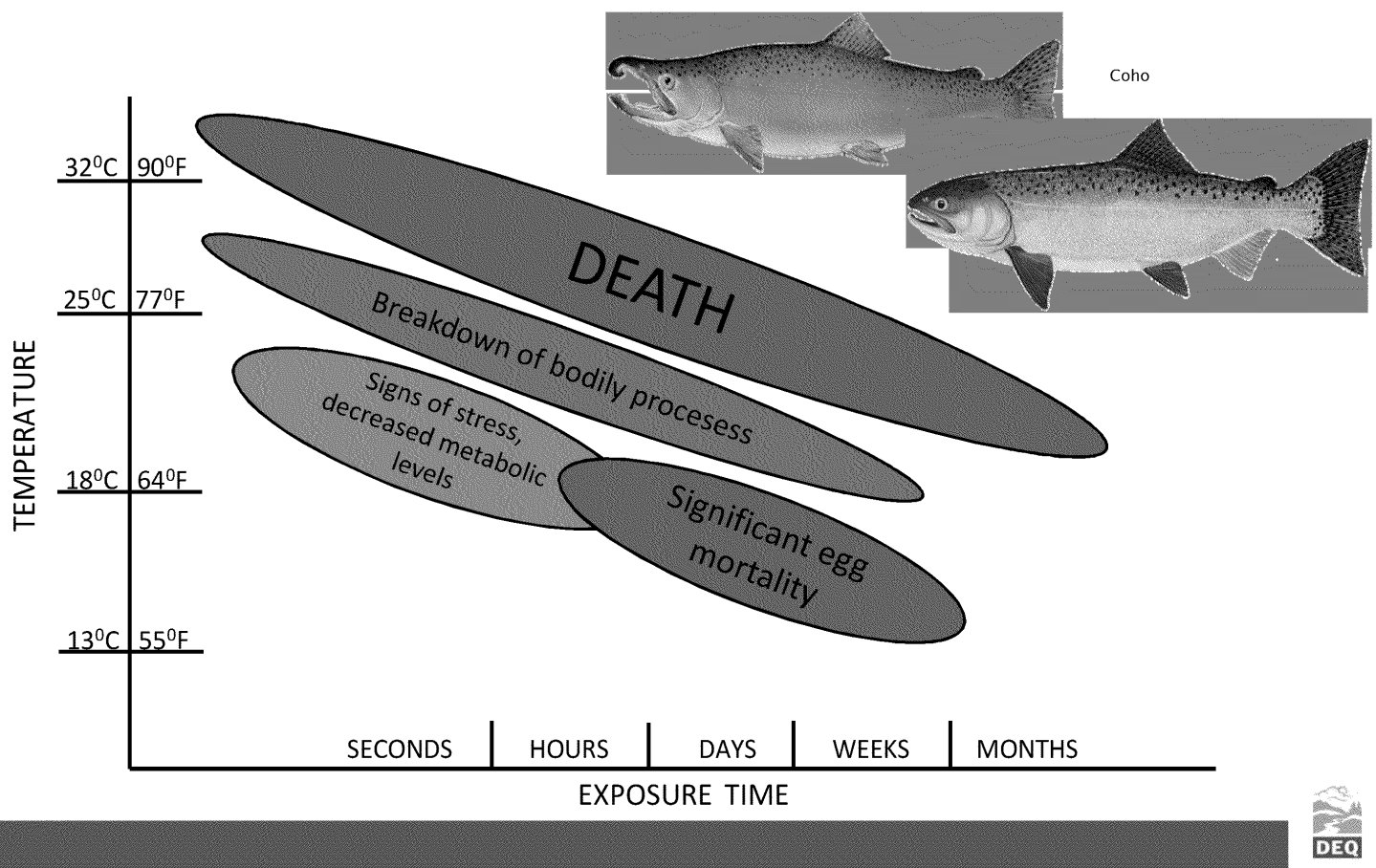


Oregon's Temperature Standards

- Oregon's Temperature Standard
- Temperature Analysis
- TWG Members



Why do we care about stream temperatures?



Oregon's Temperature Standard

Biologically Based Criteria

- Applied spatially and temporally based on fish use
- 13° Celsius (55.4° F) Spawning
- 16° Celsius (60.8° F) Core Cold Water Habitat
- 18° Celsius (64.4° F) Rearing & Migration
- 7-day average daily maximum

Natural Conditions Criteria

- ?? status unknown due to litigation



Figure 220A: Fish Use Designations*
Mid Coast Basin, Oregon

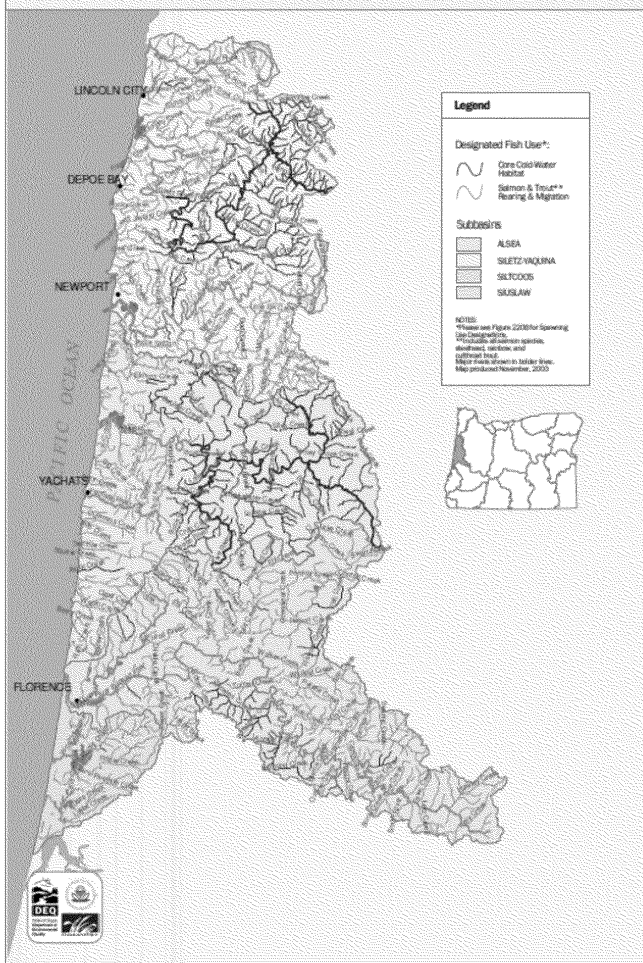
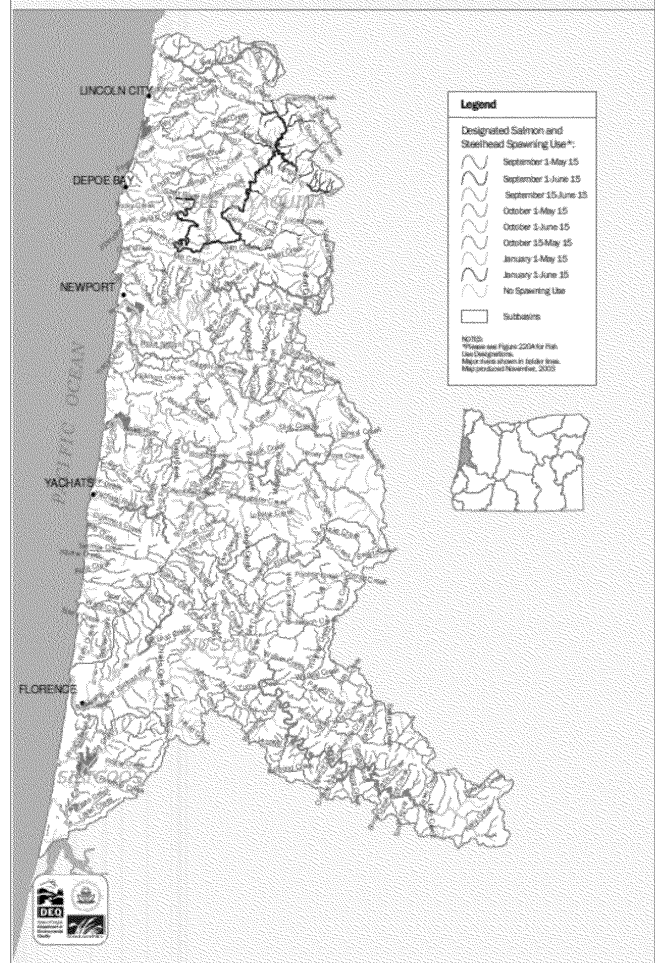


Figure 220B: Salmon and Steelhead Spawning Use Designations*
Mid Coast Basin, Oregon

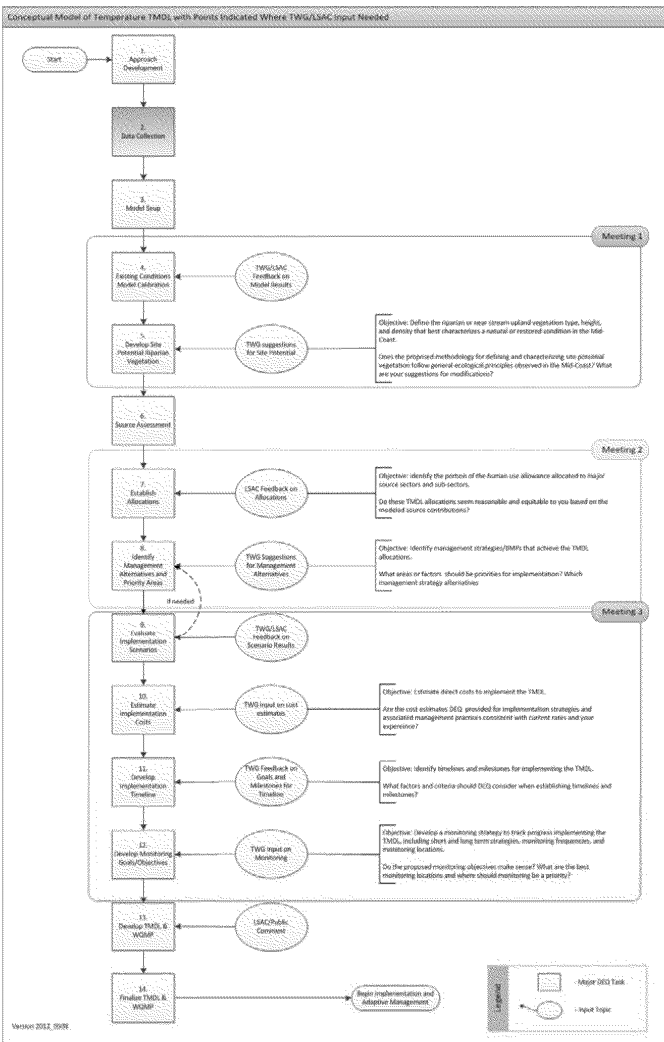


Implementing the Temperature Standard

- EQC temperature policy to minimize human warming
- Human Use Allowance 0.3° Celsius (0.24° F)
- TMDL goal is to minimize increases in temperature, not achieve an absolute temperature.

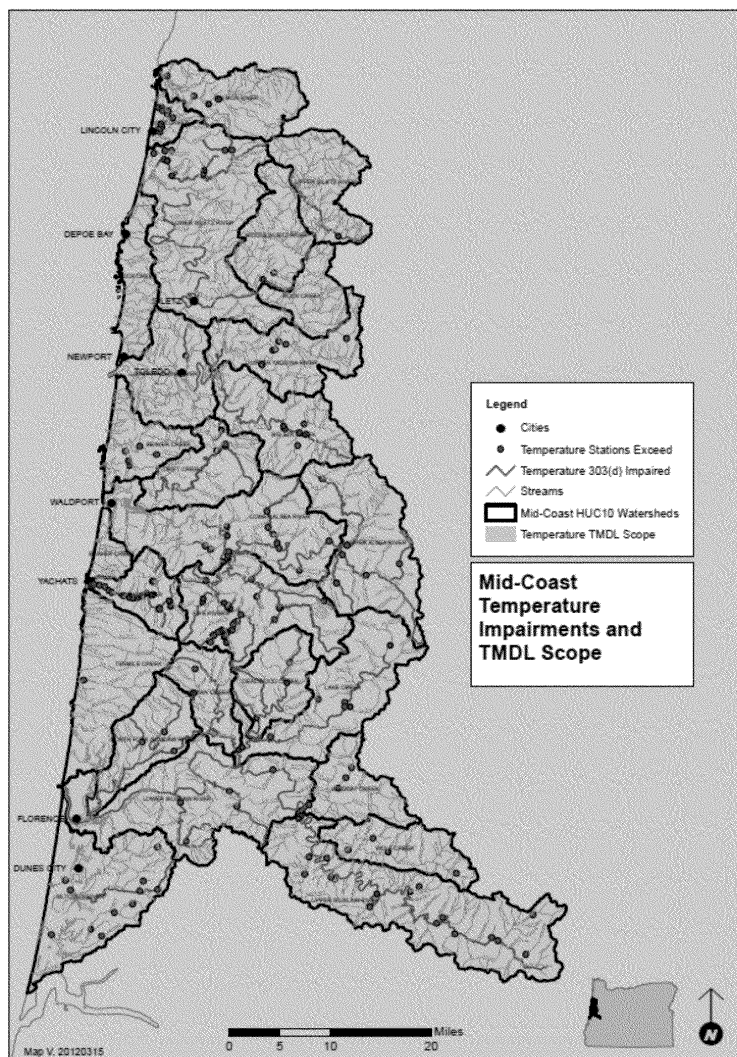


2. Data Collection



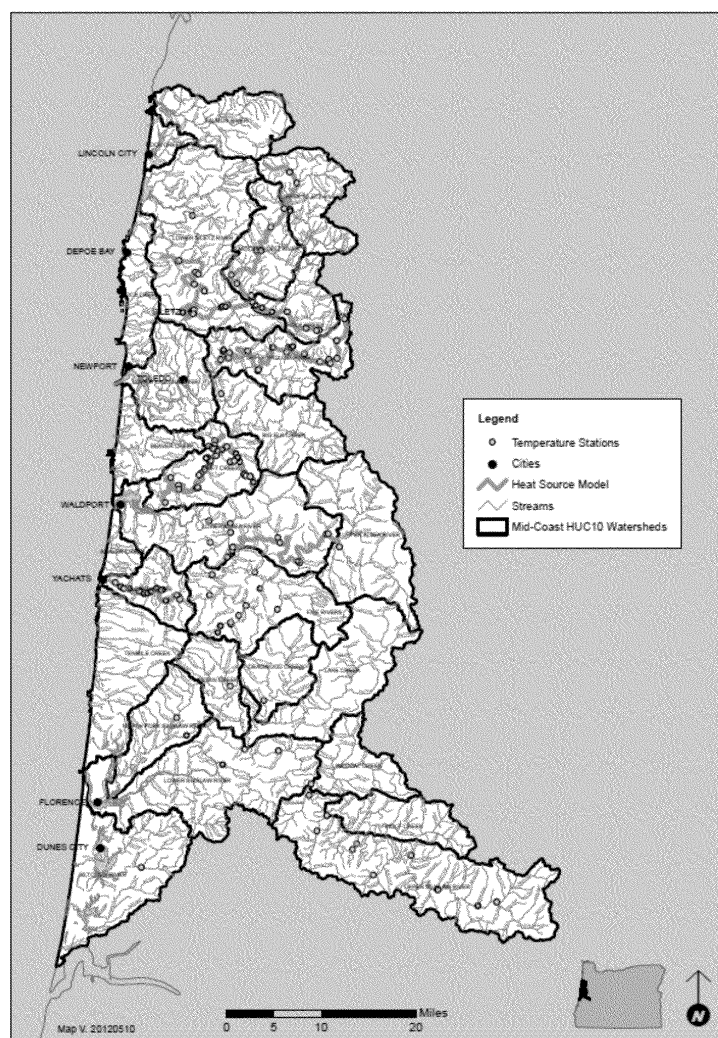
Temperature Data

- 350+ data stations analyzed (1999 – 2011)
- 200+ stations exceed the temperature standard
- 48+ streams identified as impaired - 303(d) list



Flow and Habitat Data

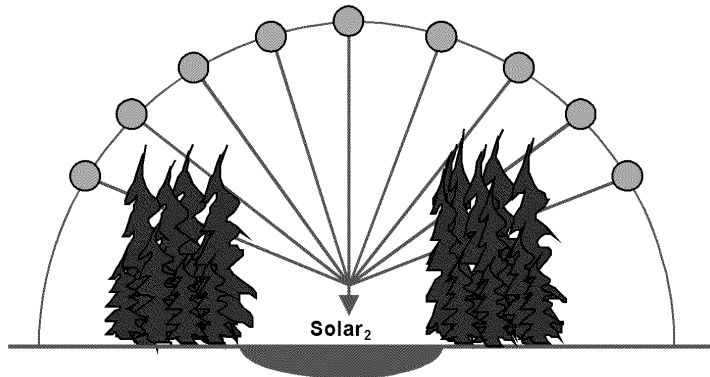
- Instantaneous stream flow
- Continuous stream flow
- Stream velocity
- Stream width/depth
- Substrate
- Vegetation Type
- Vegetation Height
- Effective Shade



Effective Shade - Defined

Percent of the daily solar radiation blocked by vegetation and topography.

Solar₁ – Potential daily direct beam solar radiation load adjusted for julian day, solar altitude, solar azimuth and site elevation.



$$\text{Effective Shade} = \frac{\text{Solar}_1 - \text{Solar}_2}{\text{Solar}_1}$$

Where,

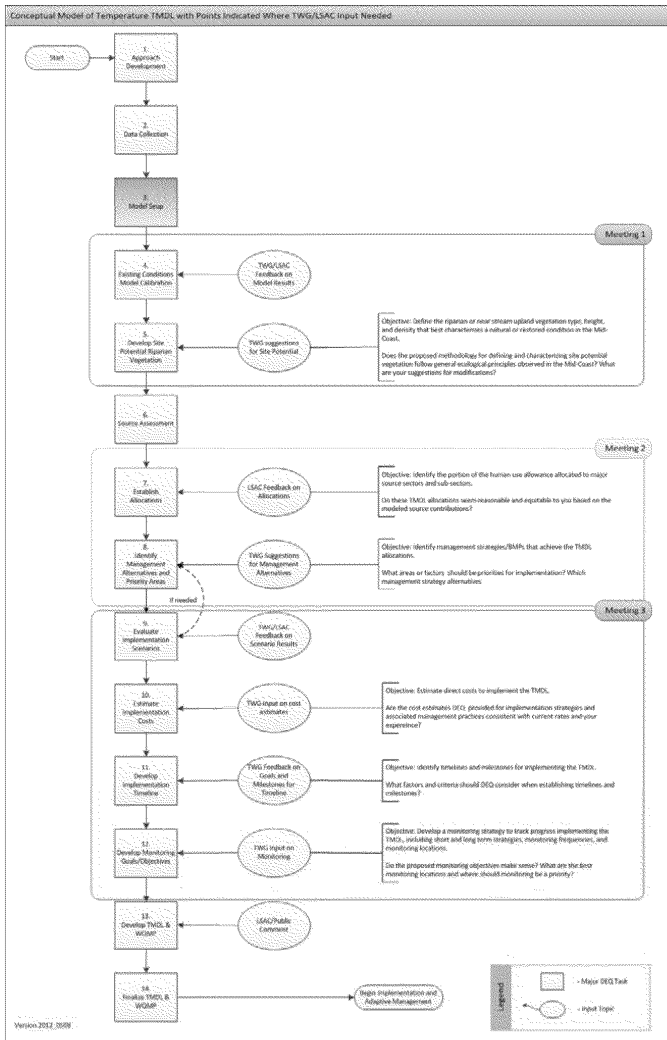
Solar₁: Potential Daily Direct Beam Solar Radiation Load

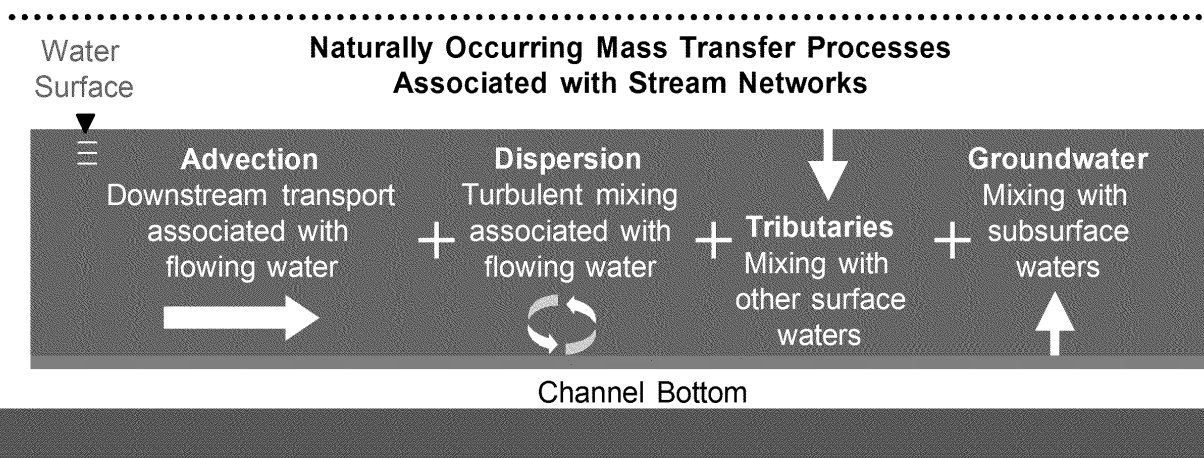
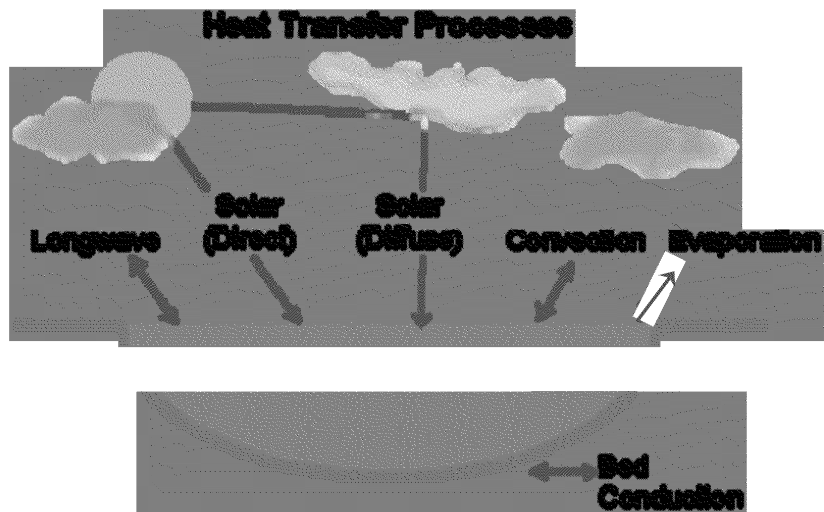
Solar₂: Daily Direct Beam Solar Radiation Load Received at the Stream Surface

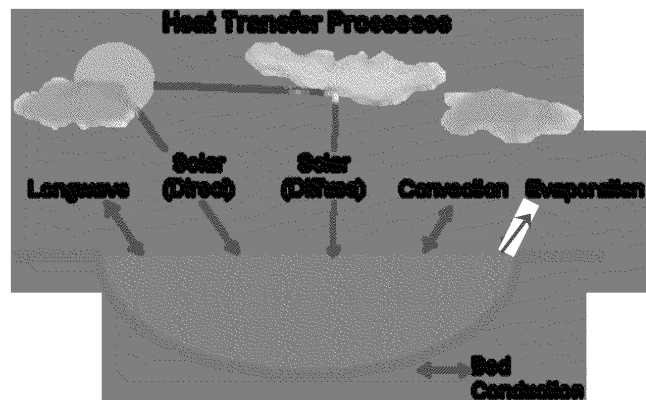
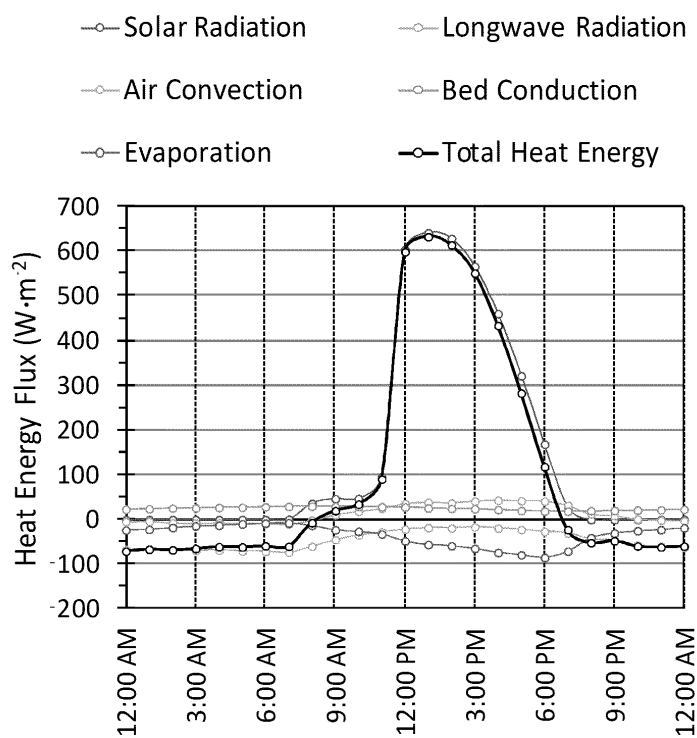


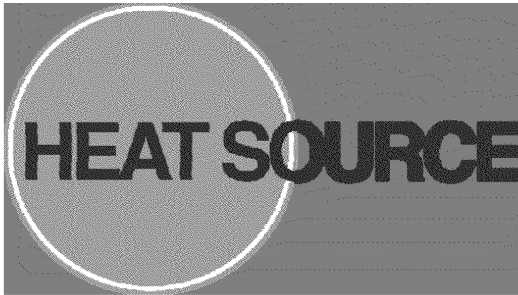


3. Model Setup









- ❑ Developed at Oregon State University
- ❑ Open source
- ❑ Peer reviewed
- ❑ Used all over the world for temperature studies
- ❑ Models stream temperature, solar radiation, and hydrology



Model Inputs

- ☐ Stream Position
- ☐ Channel Shape
- ☐ Vegetation/Landcover/Topography
- ☐
- ☐
- ☐





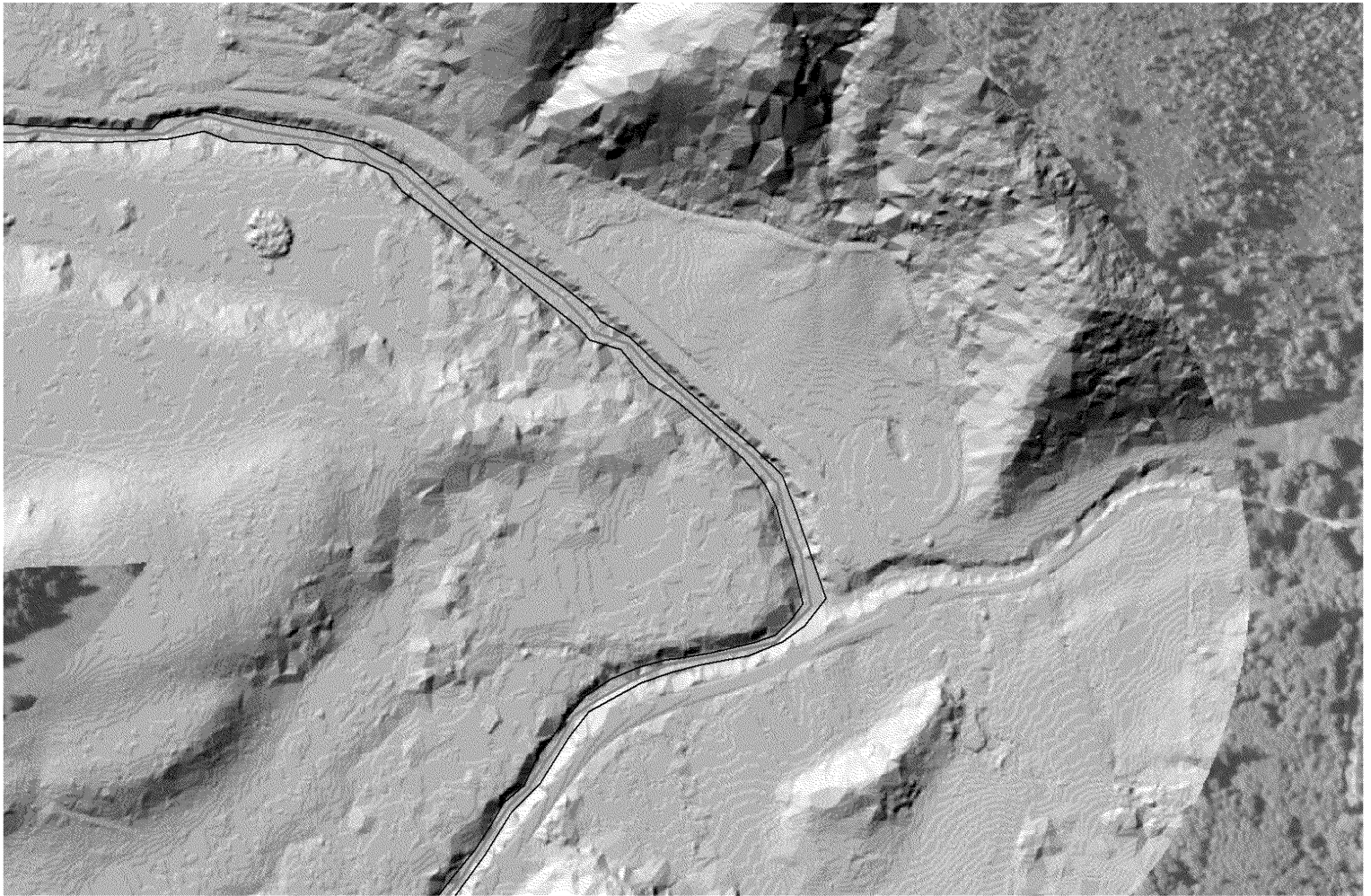
Yachats River and North Fork Yachats confluence





Digitize stream centerline and channel banks





LiDAR bare earth model







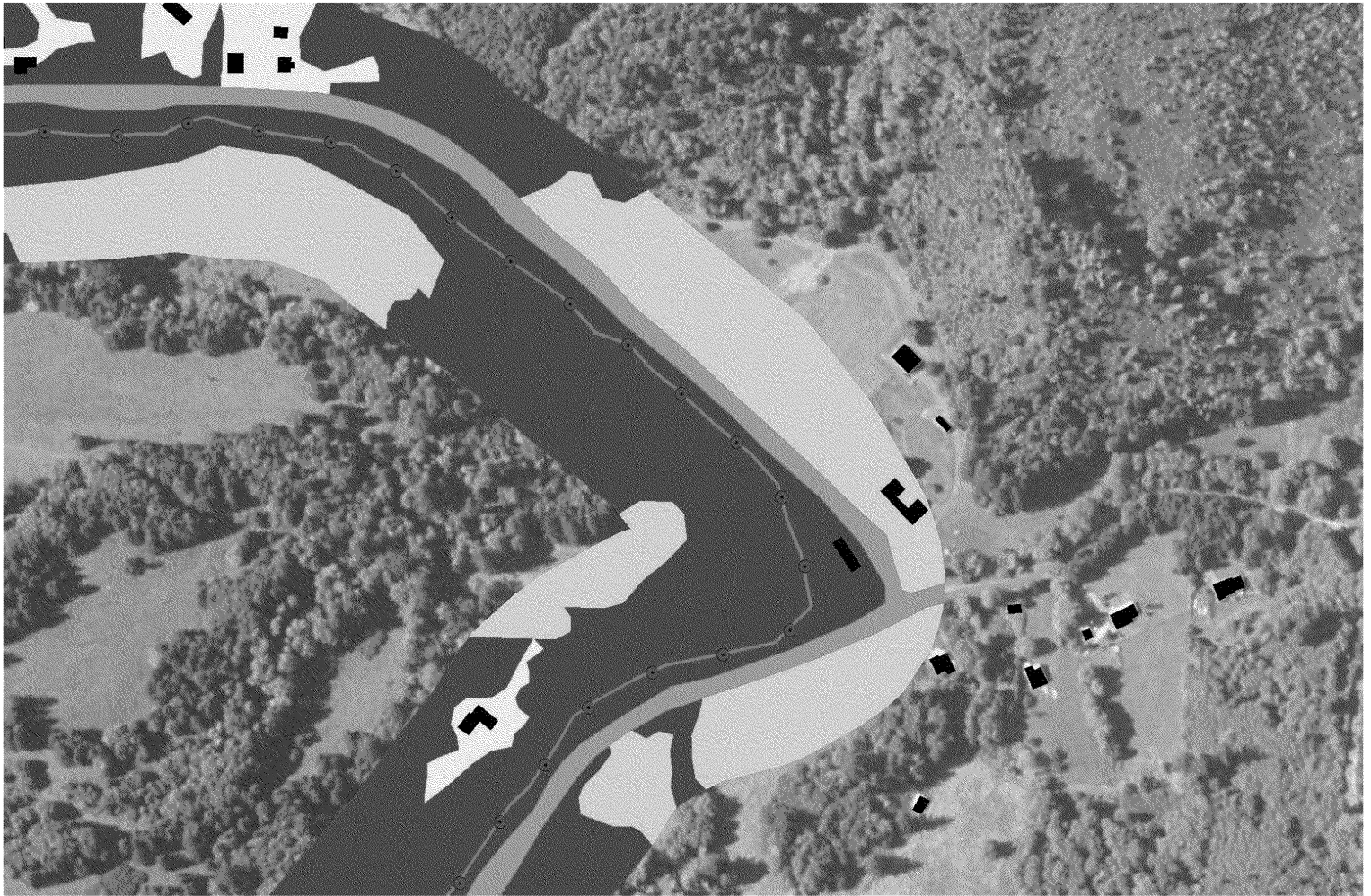
Digitize landcover





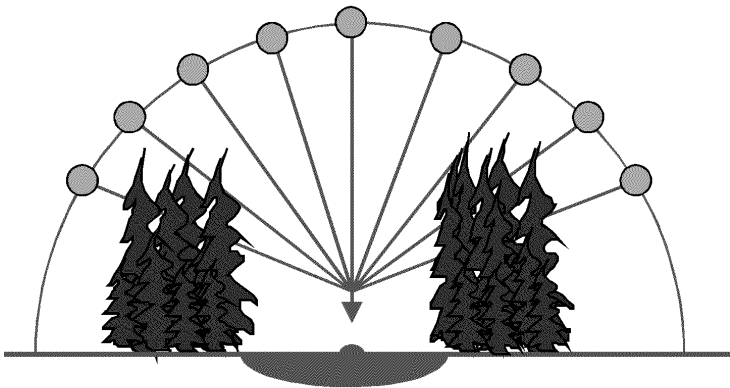
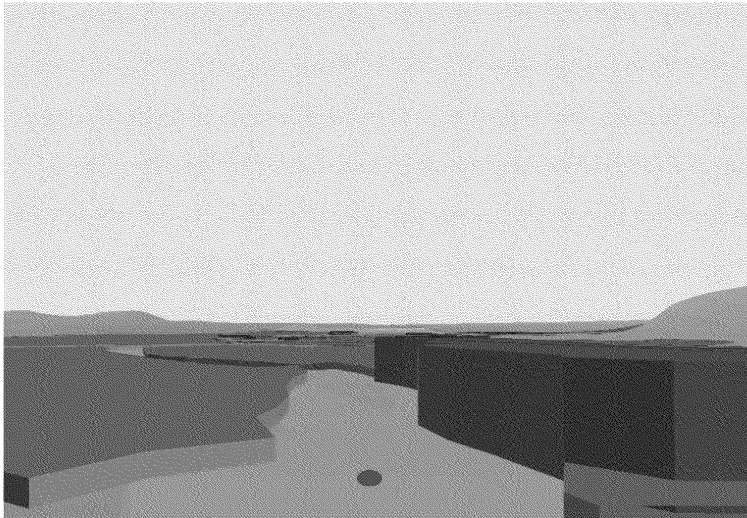
Each polygon has a height and density association





Stream segmentation (50 meters)

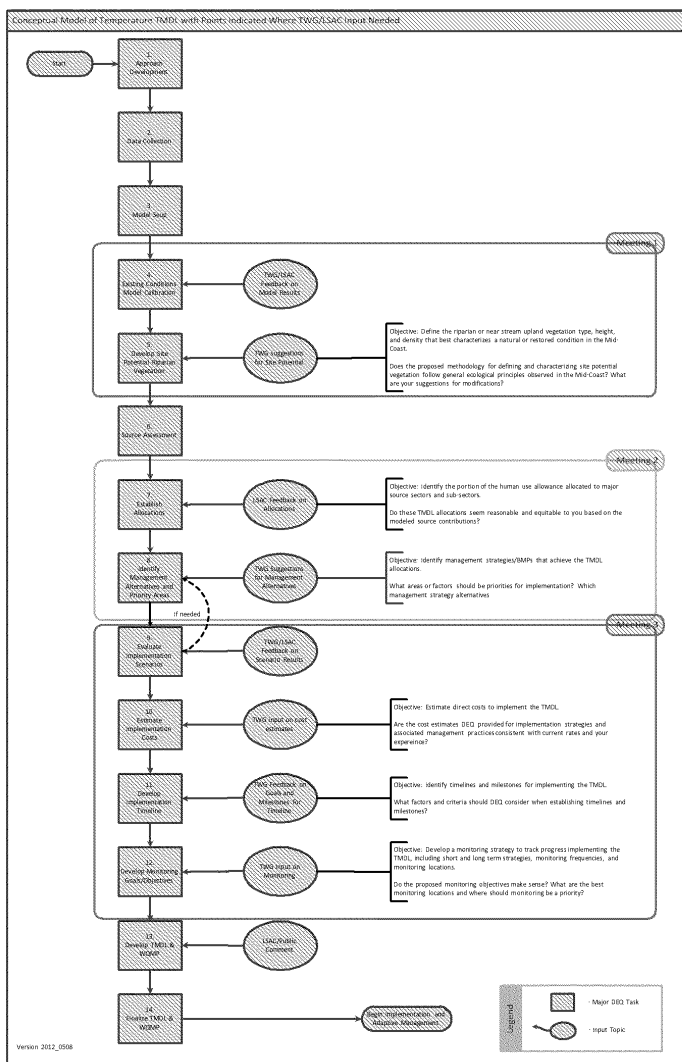




Model Inputs

- Stream Position
- Channel Shape
- Vegetation/Landcover/Topography
- Climate Data
- Point Source Discharges
- Boundary Conditions
 - Stream Temperature & flow
 - Groundwater/Withdrawals



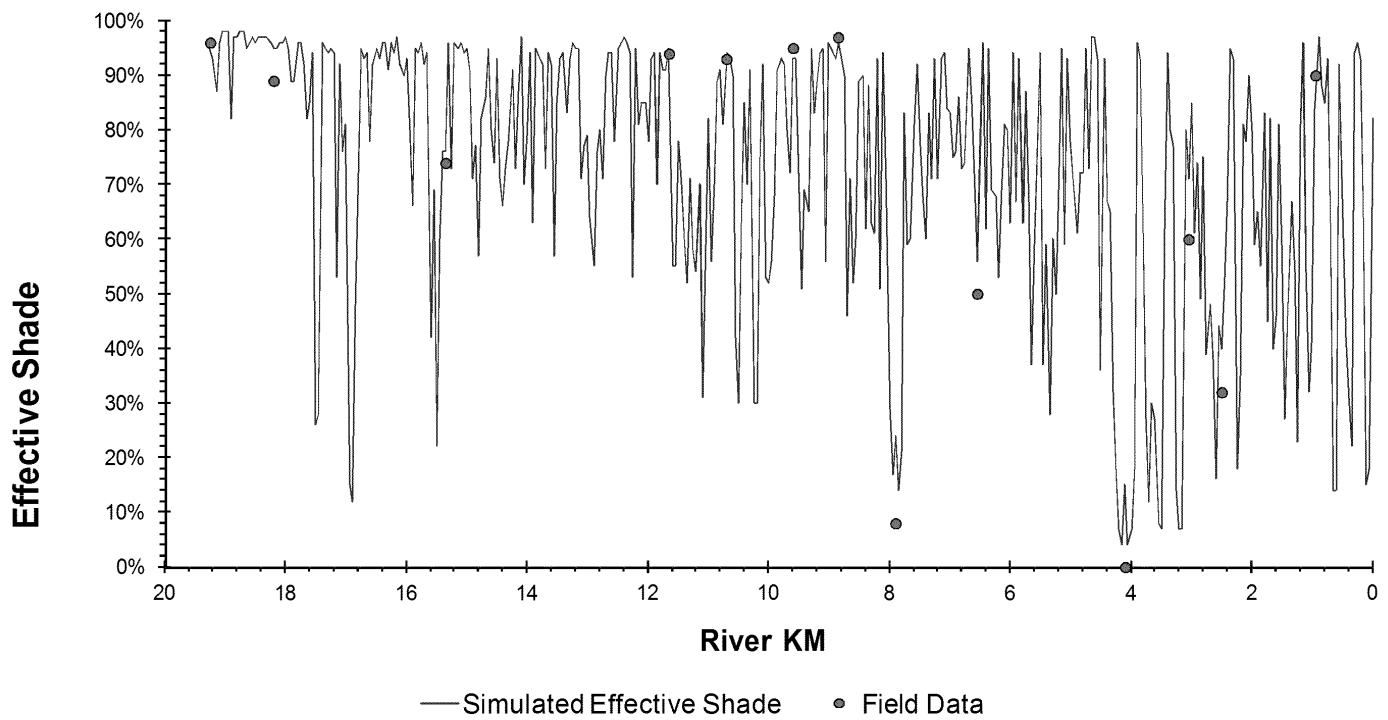


4. Existing Conditions Model Calibration

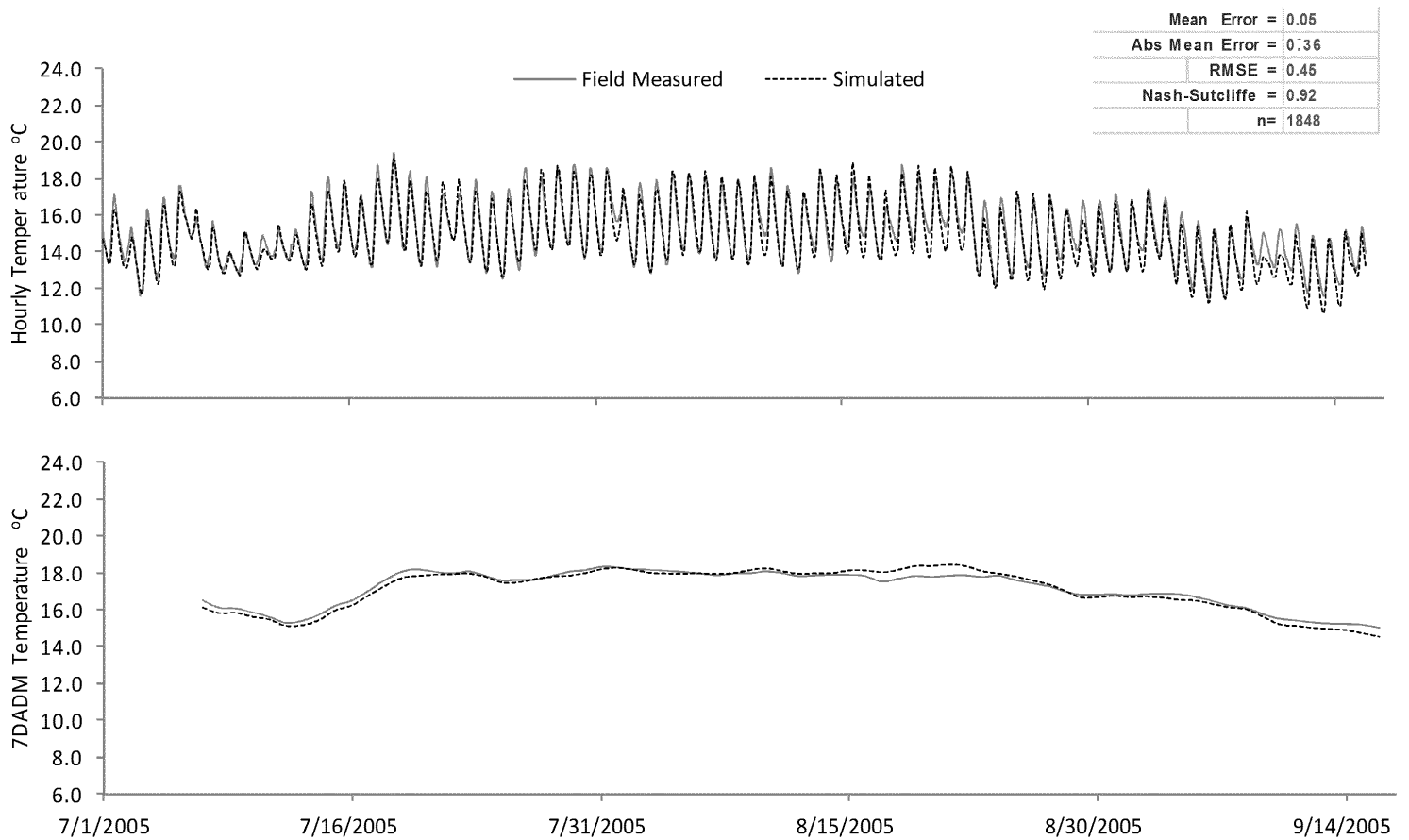
Where we are today!



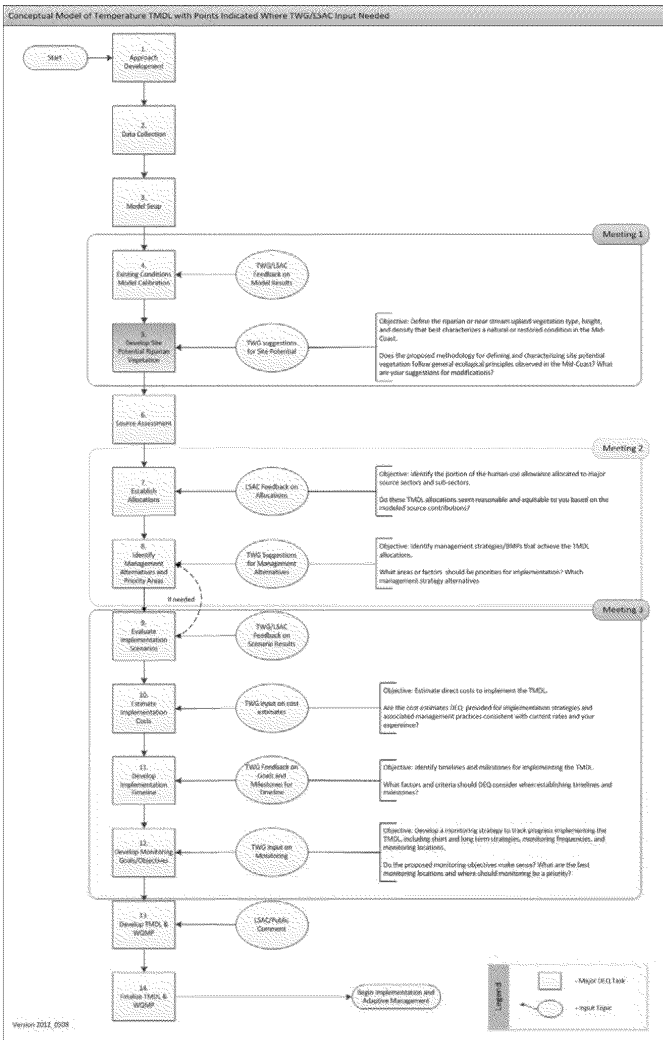
Yachats River Current Effective Shade Grass Creek to Head of Tide

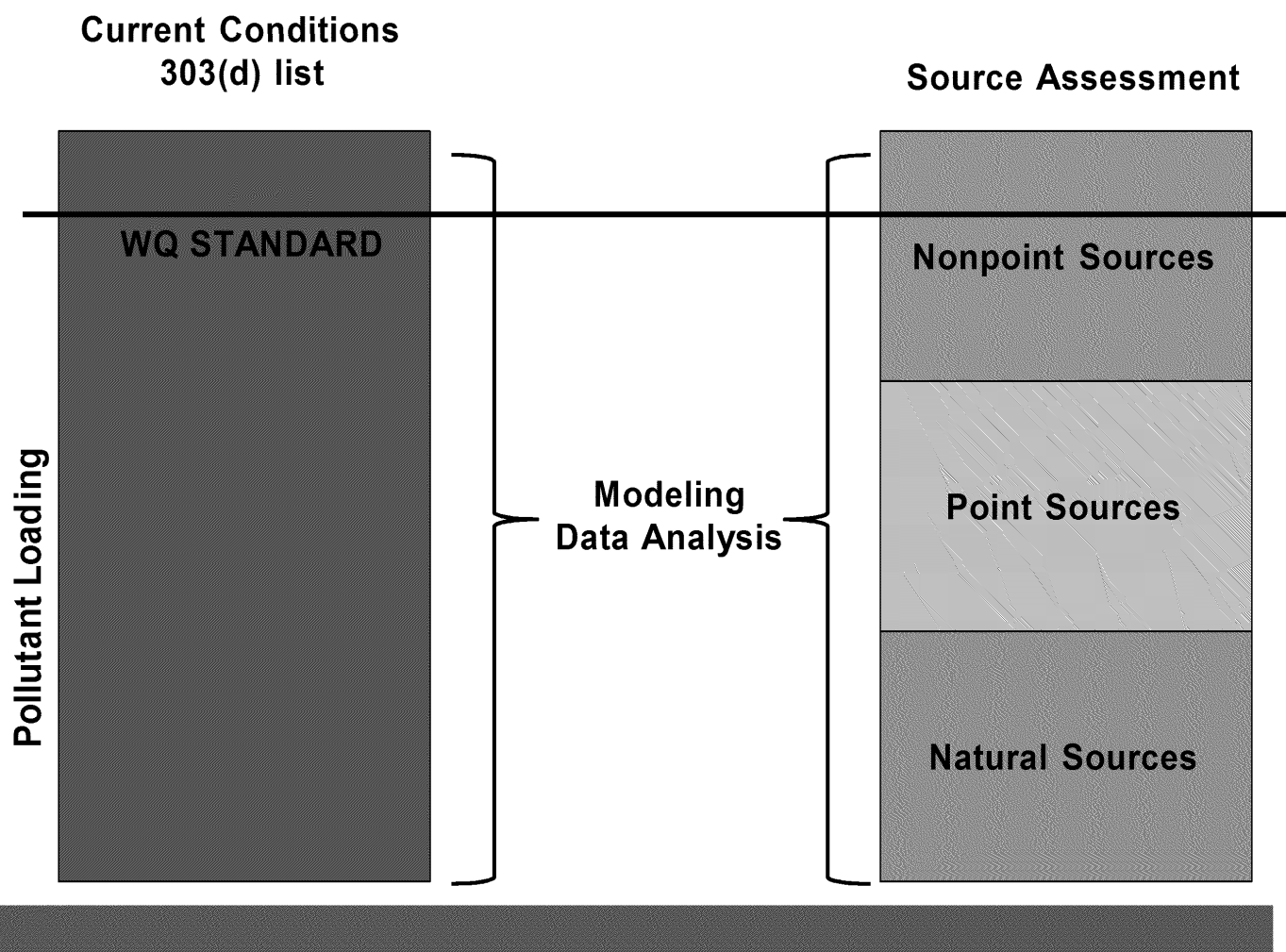


Yachats River upstream of Bend Creek - LASAR station 26531



5. Natural Conditions Model Scenario





Natural Conditions Model Scenario

Objective: Estimate stream temperatures that would occur under a natural or restored condition.

- System Potential Vegetation
- Natural Stream Flows
- Channel Complexity & Morphology Improvements



Temperature TWG Members

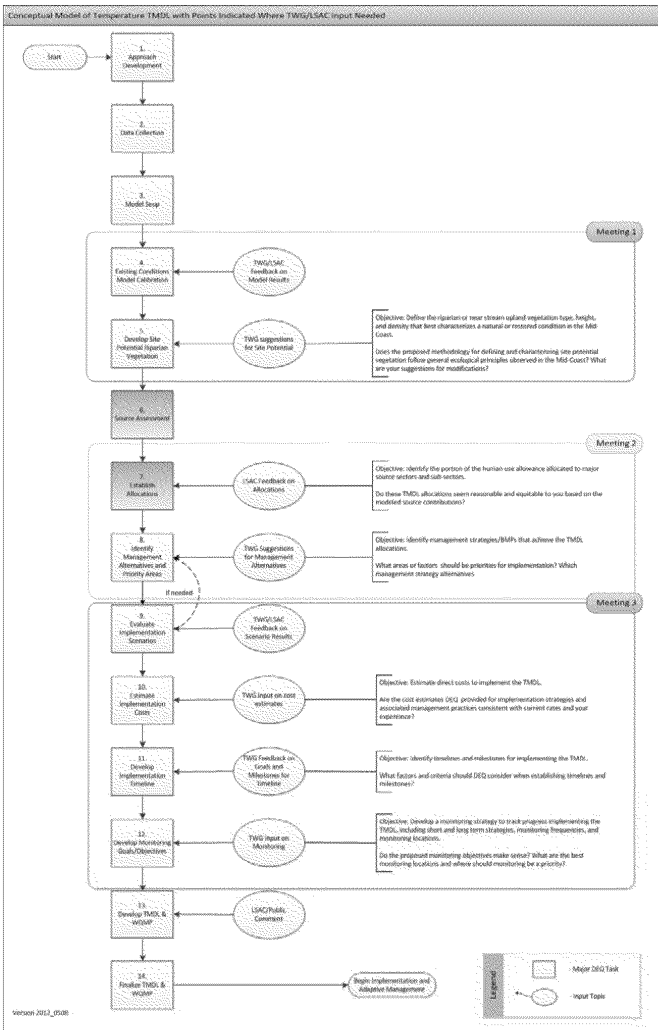
Seeking individuals with expertise/experience in the following:

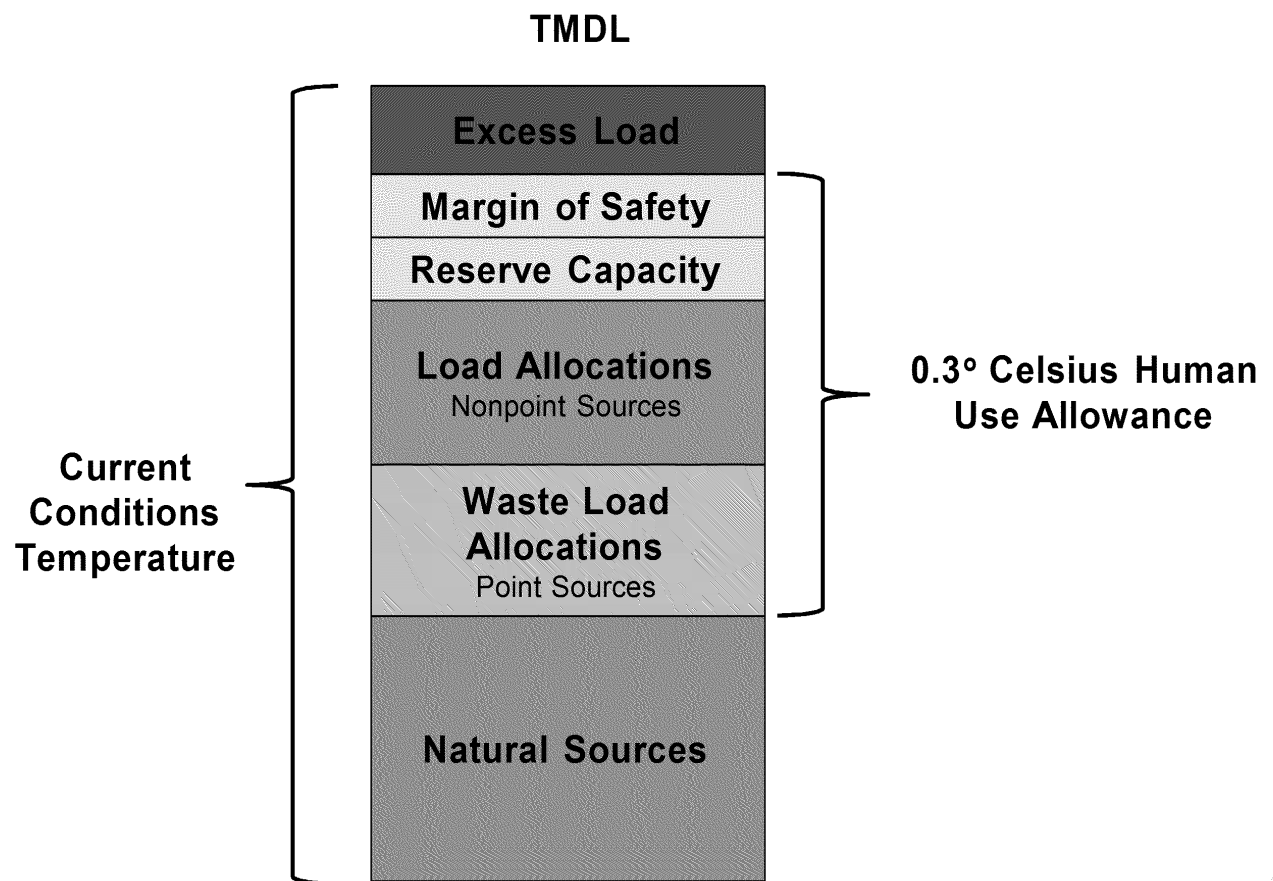
- ☐ Ecology - riparian ecosystems, vegetation succession, invasive species, disturbance
- ☐ Soils
- ☐ Stream hydrology
- ☐ Riparian or in stream restoration/management
- ☐ Temperature data collection, modeling, or analysis



6. Source Assessment

7. Establish Allocations

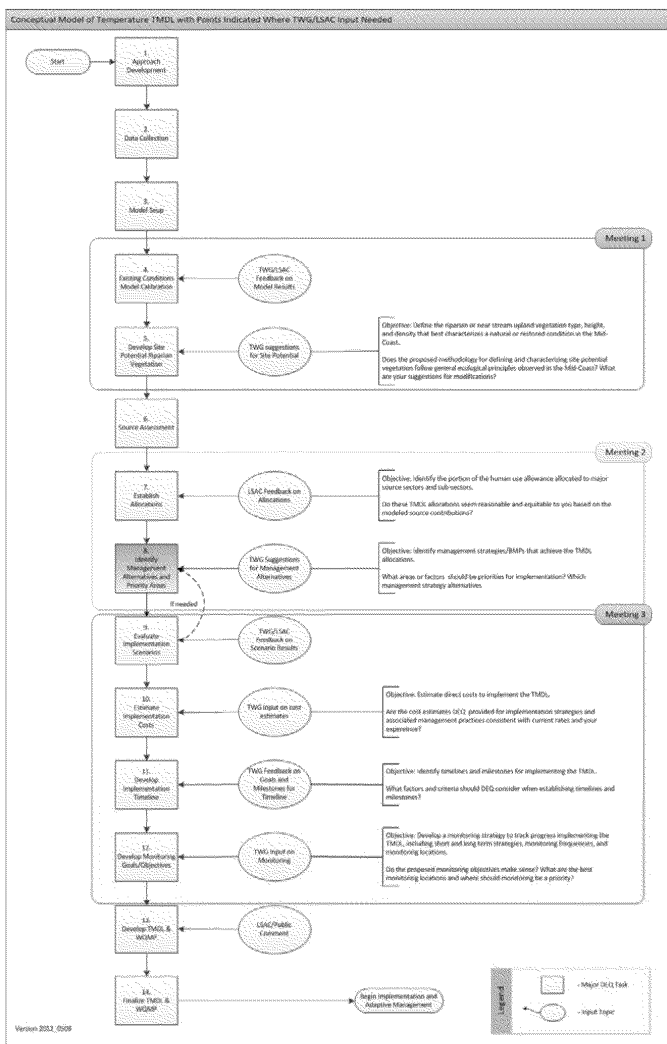




Allocations

Amount of allowable temperature increase for different
human sources





8. Identify Management Alternatives and Priority Areas

TWG Meeting 2



Existing Plans Assessment

Objective: Evaluate ability of existing plans and rules to minimize anthropogenic warming and meet the allocations.

- County/Municipal Riparian Ordinances
- Federal Northwest Forest Plan
- Oregon Forest Practices Act
- Agricultural Water Quality Plans & Rules



Additional Management Measures

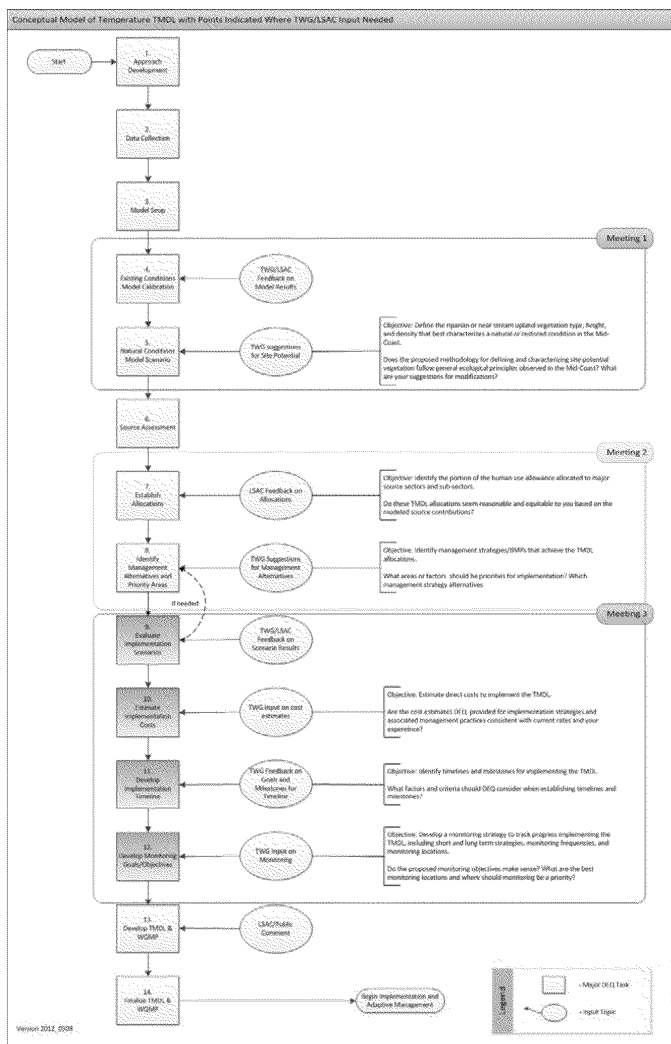
Objective: Identify alternative management measures to achieve the TMDL load allocation

- Effective shade target
- Buffer width target
- Basal area target / tree density target
- Acres of overstory vegetation, etc

Objective: Identify priorities for implementation

- Focus watersheds
- Focus activities





9. Review Implementation Scenarios

10. Estimate Implementation Costs

11. Implementation Timeline

12. Monitoring Objectives

TWG Meeting 3



Questions?

